



Dice
Environmental
Acoustics

Hamilton Business Park Noise Impact Assessment

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Executive Summary

Dice Environmental were commissioned by Ocean Infinity to undertake a Noise Impact Assessment to support a planning application for the proposal at Hamilton Business Park, Southampton.

Noise Surveys

Environmental noise surveys have been completed to quantify the prevailing soundscape at the site. This comprised 2 no, unattended logging survey to capture the existing background noise levels at the nearest noise sensitive receptors (NSR's), supplemented with an attended measurement of the proposed noise sources including the transport and storage of plant items.

Noise Impact Assessment

A 3D CadnaA noise model has been constructed to predict the noise impact from the proposed use upon the nearest noise sensitive residents surrounding the site.

An assessment has been undertaken of the noise associated with the proposed use of the external area to the north of the site. The findings indicate that the predicted noise levels from the proposed activity will be below the existing background sound levels at NSR2 whilst a slight exceedance can be found at NSR1. This largely demonstrates compliance with the relevant criteria of BS4142 and indicates that the proposed use is not expected to give rise to any adverse impact at the NSR2. Whilst an exceedance is predicted at NSR1, the context of the operations should be seriously considered as the activities will be sporadic in nature, occurring fleetingly throughout the year, as opposed to per day.

1. Introduction

1.1. Background

Dice Environmental has been commissioned by Ocean Infinity, to provide a Noise Impact Assessment to support a planning application for the additional use of the external space to the north of the site at Hamilton Business Park, Southampton, to be referred to hereafter as “the site”.

The site is located within the established Hamilton Business Park (Botley Road, Hedge End, SO30 2JR). The surrounding area is predominantly commercial/industrial in nature, comprising warehouse, distribution and trade-counter units, alongside major road links. Residential dwellings are situated to the north of the site and to the east, on the adjacent side of the DPD unit.

The site comprises a single industrial unit amongst existing commercial and industrial units within Hamilton Business Park. The site currently has car parking facilities to the south and north of the unit. The majority of the operations associated with the site are undertaken internally.

The assessment has been undertaken to determine the impact of further utilising the space available by creating external storage space to the north of the site to store infrequently moved equipment. The proposal only includes for daytime operations in line with the premises’ operating hours.

The site location and measurement positions are shown in Figure 1 of this report.

1.2. Limitations

All limitations of this report are presented in Appendix I.

1.3. Confidentiality

Dice Environmental has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Dice Environmental; a charge may be levied against such approval.

2. Assessment Methodology

2.1. National Planning Policy Framework

National Planning Policy Framework [1] states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision-taking should take account of the acoustic environment and in doing so consider:

- Whether or not significant adverse effect is occurring or is likely to occur
- Whether or not adverse effect is occurring or is likely to occur; and
- Whether or not a good standard of amenity can be achieved.

In line with the Explanatory Note of the Noise Policy Statement for England [2], this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The Observed Effect Levels are as follows:

- Significant Observed Adverse Effect Level (SOAEL): This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest Observed Adverse Effect Level (LOAEL): This is the level of noise exposure above which adverse effects on health and quality of life can be detected;
- No Observed Adverse Effect Level (NOAEL): This is the level of noise exposure at which the noise is noticeable but has no effect at all on health or quality of life.
- No Observed Effect Level (NOEL): This is the level of noise exposure below which noise is not audible.

Table 1 summarises the noise exposure hierarchy, based on the likely average response.

Table 1: Noise exposure hierarchy

Perception	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No effect	No observed effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No observed adverse effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed adverse effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological, e.g., regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable adverse effect	Prevent

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

These factors include:

-
- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
 - For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise; and
 - The spectral content and general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- Where applicable, the cumulative impacts of more than one source should be taken into account, along with the extent to which the source of noise is intermittent and of limited duration.
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.
- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.2. British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*

BS4142 [3] describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes
- Sound from fixed installations which comprise mechanical and electrical plant and equipment
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial site.

The procedure detailed in the standard compares the measured or predicted noise level, 'the specific noise level', from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.

The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00-23:00): 1 hr; and,
- Night-time (23:00-07:00): 15 minutes.

There are a number of 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows:

Tonality

- +2 dB: where the tonality is just perceptible
- +4 dB: where the tonality is clearly perceptible
- +6 dB: where the tonality is highly perceptible

Impulsivity

- +3 dB: where the impulsivity is just perceptible
- +6 dB: where the impulsivity is clearly perceptible
- +9 dB: where the impulsivity is highly perceptible

Intermittency

- +3 dB: where the intermittency is readily distinctive against the acoustic environment

In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3 dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment.

BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background noise level can yield the following commentary:

- Typically, the higher the rating level is above the background sound level, the greater the magnitude of impact.

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- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
 - Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

With the above in mind, it is common that a Local Planning Authority will specify their own criteria for the rating level relative to the background sound level and, where this is the case, this criterion usually takes precedence over a simple comparison of the rating level against the background sound level.

BS4142 includes the following text in relation to areas with low and very low noise levels:

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

3. SURVEYS

3.1. Background and Ambient Noise Survey

Dice has conducted a background and ambient noise survey at a location representative of the nearest noise sensitive dwellings in order to measure the level of noise currently present within the area. The noise surveys took place over the following periods:

- 10:45 Wednesday 12th November 2025 to 07:45 Thursday 20th November 2025; and
- 11:15 Wednesday 12th November 2025 to 08:00 Thursday 20th November 2025.

The following noise measurement positions were chosen:

- Noise Measurement Position 1 (NMP1): A background and ambient noise survey was undertaken to the north of the development at a location representative of the noise sensitive dwellings situated to the north off of Hansen Gardens. The microphone was situated approximately 2.5m from the ground and in free field conditions; and
- Noise Measurement Position 2 (NMP2): A background and ambient noise survey was undertaken to the east of the development, adjacent to the DPD unit at a location representative of the nearest noise sensitive dwellings situated off Haileybury Gardens. The microphone was situated approximately 1.5m from the ground and in free field conditions.

A summary of the measured sound pressure levels is presented in Table 2 and Table 3 respectively.

Table 2: Summary of measured background sound levels – NMP1

Date Range	Period	Ambient sound level, L _{Aeq,T} , dB	Background sound level dB L _{A90,T}	
			Range	Typical*
Wed. 12 Nov. 2025	Day (08:00-17:00)	53	44-53	52
Thur. 13 Nov. 2025	Day (08:00-17:00)	55	41-53	51
Fri. 14 Nov. 2025	Day (08:00-17:00)	56	47-53	49
Sat. 15 Nov. 2025	Day (08:00-17:00)	45	36-46	40
Sun. 16 Nov. 2025	Day (08:00-17:00)	46	38-44	40
Mon. 17 Nov. 2025	Day (08:00-17:00)	51	42-48	43
Tue. 18 Nov. 2025	Day (08:00-17:00)	56	47-53	49
Wed. 19 Nov. 2025	Day (08:00-17:00)	45	36-46	38
Thur. 20 Nov 2025	Day (08:00-17:00)	46	40-44	40
Average	Day (08:00-17:00)	50	41-49	45

*Based on modal values occurring within each stated time period

Table 3: Summary of measured background sound levels- NMP2

Date Range	Period	Ambient sound level, L _{Aeq,T} , dB	Background sound level L _{A90,T} , dB	
			Range	Typical*
Wed. 12 Nov. 2025	Day (08:00-17:00)	52	44-48	47
Thur. 13 Nov. 2025	Day (08:00-17:00)	51	40-48	44

Date Range	Period	Ambient sound level, $L_{Aeq,T}$, dB	Background sound level $L_{A90,T}$, dB	
			Range	Typical*
Fri. 14 Nov. 2025	Day (08:00-17:00)	54	46-55	47
Sat. 15 Nov. 2025	Day (08:00-17:00)	50	39-43	41
Sun. 16 Nov. 2025	Day (08:00-17:00)	51	38-44	40
Mon. 17 Nov. 2025	Day (08:00-17:00)	48	40-44	42
Tue. 18 Nov. 2025	Day (08:00-17:00)	50	40-53	43
Wed. 19 Nov. 2025	Day (08:00-17:00)	53	44-53	47
Thur. 20 Nov 2025	Day (08:00-17:00)	54	40-41	40
Average	Day (08:00-17:00)	51	41-48	43

*Based on modal values occurring within each stated time period

3.2. Noise Survey

Dice has conducted an attended noise survey of the activities associated with the proposal. Attended measurements were undertaken of operational movements to replicate the external space's intended use. Activities included plant items being manoeuvred and the operation of curtain sliders on the delivery vehicle. Activity occurred for the duration of the 1-hour period. Examples of the equipment to be used are shown in Figure 3 of Appendix III.

The noise survey took place over the following period:

- 09:00 to 10:00 Thursday 20th November 2025.

The survey was undertaken at the following position:

- Noise Measurement Position 3 (NMP3). Dice undertook an attended survey of operational moves to replicate the external use's intended use. This included activities as presented within the table below.

A summary of the measured sound pressure levels is presented in Table 4.

Table 4: Summary of measured noise levels at NMP3

Source	Distance to measurement (m)	Duration (mm:ss)	Measured sound pressure levels, free-field $L_{Aeq,T}$, dB	'On-time' calculation for any one-hour period $L_{Aeq,T}$, dB
Items travelling from storage and being loaded onto a delivery vehicle	2	32:16	71.1	57.6
Reverse Beepers	2	07:42	73.5	67.5
Curtain Sliders	1	01:51	83.0	77.0

3.3. Survey Conditions

The weather conditions during the noise surveys were largely conducive towards the measurement of environmental noise being fine and dry with wind speeds largely below 5 m/s. The below table presents the weather conditions for the duration of the survey.

Table 5: Weather Conditions

Date	Period	Wind Speed (mph)	Rain	Comments
12/11/25	Daytime 11:15-23:00	9-10	No	Partly Cloudy
	Nighttime 23:00-07:00	3-10	No	Partly Cloudy
13/11/25	Daytime 07:00-23:00	3-8	No	Partly Cloudy
	Nighttime 23:00-07:00	3-10	Yes	Short periods of light rain
14/11/25	Daytime 07:00-23:00	3-12	Yes	Short periods of increased wind speeds. Speeds suitable for the duration of this period. Light Drizzle
	Nighttime 23:00-07:00	7-8	Yes	Light drizzle
15/11/25	Daytime 07:00-23:00	1-8	No	Partly Cloudy
	Nighttime 23:00-07:00	1-2	No	Cloudy
16/11/25	Daytime 07:00-23:00	7-12	No	Mostly Cloudy
	Nighttime 23:00-07:00	1-3	No	Fog
17/11/25	Daytime 07:00-23:00	0-13	No	Fair
	Nighttime 23:00-07:00	8-10	No	Fair
18/11/25	Daytime 07:00-23:00	1-8	No	Fair
	Nighttime 23:00-07:00	1-2	No	Fair
19/11/25	Daytime 07:00-23:00	6-14	No	Short period of snow in the AM. Some increased wind speeds throughout the day.
	Nighttime 23:00-07:00	3-7	No	Fair
20/11/25	Daytime 07:00-08:00	3-6	No	Fair and slightly cloudy

The noise survey was completed using the following noise measurement equipment.

Table 6: Noise Measurement Equipment

Position	Description	Manufacturer & Type	Serial No.	Calibration Expiry
NMP1 & NMP3	Sound Level Meter	01dB Solo	65947	6 Dec. 25
	Pre-amplifier	01dB-Metravib Pre21S	16255	
	Microphone	01dB MCE 212	175280	
	Calibrator	01dB-Stell Cal21	34744600 (2014)	6 Jan. 26
NMP2	Sound Level Meter	01dB Solo	65771	29 May. 26
	Pre-amplifier	01dB-Metravib Pre21S	17100	
	Microphone	01dB MCE 212	447457	
	Calibrator	01dB-Stell Cal21	34975432 (2017)	17 Jun. 26

The sound level meters were field-calibrated on site prior to and after the measurements were taken. No significant drift was witnessed.

4. Noise Impact Assessment

4.1. Noise model

In order to accurately assess noise propagation across and from the site, a 3D noise model has been constructed using the modelling software CadnaA. The following assumptions, inputs and considerations have been included in the model:

- Terrain data taken from DEFRA Data Services Platform [4];
- Planning layout drawing as described in Section 1;
- Existing buildings that provide shielding from any of the noise sources;
- Source measurements of the operational activities have been successfully used to calibrate the model;
- Measured noise levels have been adjusted to account for 'on-time' in any one hour period;
- A reflection order of 2 has been used in all calculations;
- Building heights are as supplied by the client; and
- Noise levels generated using ISO 9613-1 [5] and ISO 9613-2 [6] as incorporated into CadnaA software.

4.2. Noise Sensitive Receptors

The nearest noise sensitive receptors (NSR's) have been identified as the residential dwellings situated within 100m of the sites boundary. The table below characterizes the receptors used for the purpose of this assessment.

Table 7: Nearest Noise Sensitive Receptors (NSR's)

Receptor	Description	Distance to proposed external space (m)
NSR1	Residential dwellings situated off of Hansen Gardens. External amenity space determined as closest noise sensitive area. Approximate 1.8m barrier situated to the rear of the residential garden. Additional approximate 1.8m fence situated to the northern boundary of the site itself.	23m from the northern boundary of the site to the external garden barrier.
NSR2	Residential dwellings situated off of Haileybury Gardens. External amenity space determined as closest noise sensitive area. DPD unit provides shielding from noise associated with the proposal.	80m from the eastern boundary of the site to the external garden. Distance does not include for obstacles in the form of DPD unit. Distance is a direct line.

It should be noted that NSR2 benefits from the topography of the area and of the barrier formed by the DPD unit. No noise from the site was audible at this location, all audible noise was from the operations at DPD and from the local road network. Figure 1 below demonstrates the noise sensitive receptor locations shown in red outline. The proposed area of operation is shown in green.

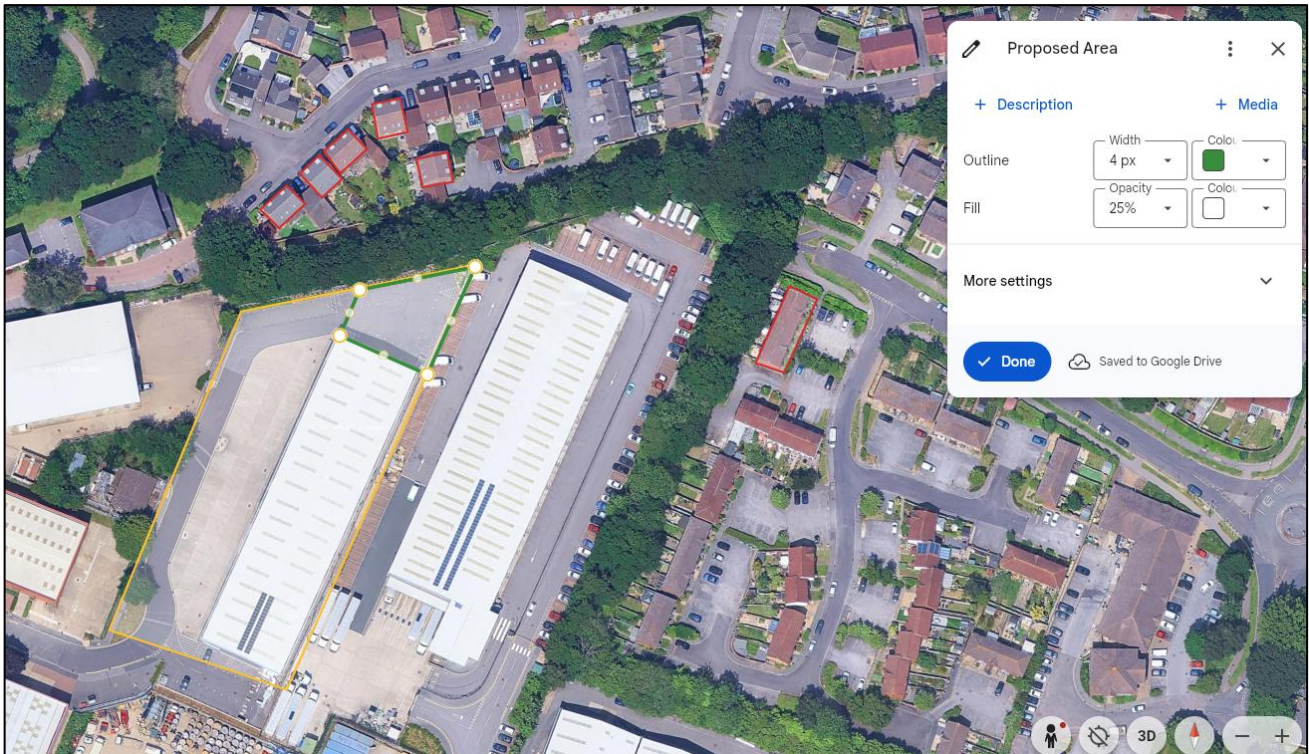


Figure 1: Nearest Noise Sensitive Receptors (NSRs)

4.3. BS4142 Assessment

The following numerical assessments have been provided in accordance with BS4142 [3] to provide a comparison between rating sound levels of the activities associated with the proposal against the typical sound levels existing prior. The assessment has been undertaken for the daytime period only as per the hours of operations of the proposal.

Figure 4 of Appendix III demonstrates the resultant noise levels at the proposed NSRs due to the proposed operations. The worst-case noise level associated with the proposed operations has been used for the purpose of this assessment. The assessment has determined a specific sound level of L_s 44 dB at NSR1 and L_s 19 dB at NSR2. These figures have been used for the BS4142 assessments below.

Table 8 below identifies applicable acoustic penalties based on the proposed operations of the development.

Table 8: Identification of applicable acoustic penalties

Source	Penalty	Applicable?	Attributable Penalty	Comment
Operational Noise	Tonality	Yes	+2	Tonal elements associated with the reverse beepers
	Impulsivity	Yes	+3	Impulsivity associated with full operation.
	Intermittency	--	--	--
	Other Sound Characteristic	--	--	--

Table 9 demonstrates the difference between the rating level of noise associated with the proposal against the measured existing background noise level at the nearest noise sensitive dwelling.

Table 9: BS4142 Assessment of Proposed Development

Results	Day 07:00 to 23:00		Commentary
	NSR1	NSR2	
Background sound level, dB $L_{A90,T}$	44	43	Representative background sound levels at the NSR during operating hours.
Reference time interval	1-hour		
Specific sound level, dB $L_{Aeq,T}$	45	19	Highest off-site values established from calculations undertaken within CadnaA model.
Acoustic feature correction, dB	+5		A 5dB feature correction has been applied to account features.
Rating level, dB $L_{Ar,Tr}$	49	24	Specific sound level plus acoustic feature correction.
Excess of rating over background sound level	+5	-19	Exceeds the BS4142 requirements at NMP1.
Assessment indicates likelihood of *depending on context	Low adverse impact upon existing noise sensitive receptors at NSR2. Potential adverse impact at NSR1.		
Uncertainty of the assessment	Uncertainty was minimized by measuring over an extended period and at a location directly representative of the nearest proposed NSRs and measuring the main noise source 1m to remove any external interference.		

The assessment indicates that the proposed external activity will meet and fall below existing background noise levels during any given daytime hour at NSR2. However, the assessment has found an exceedance of the background noise levels at NSR1 during the period of 08:00 and 17:00.

The nature of the proposal should be taken into further consideration when reviewing this assessment. The activity will occur only sporadically and for very limited durations throughout the yearly period rather than on a daily or regular basis. Because of this infrequency, any increase in noise would be brief, momentary, and ambient noise levels and unlikely to cause disturbance. As a result, the proposal is not expected to create any significant or sustained noise impacts.

4.4. Statement of Uncertainty

Uncertainty has been considered as a limit to the accuracy of any noise assessment, including associated steps of measurement, calculation, or prediction. Factors have been considered to include (but not limited to) the following:

- The inherent accuracy limitation of methodology in Standards and guidance.
- Variability in meteorological conditions.
- The accuracy of sound source input data of a calculation.

It is a requirement of the assessment standard BS4142 [3] to minimise uncertainty to a level commensurate with the intention of the assessment objective. Measures taken in this assessment to minimise uncertainty have included:

- Baseline sound levels have been measured over a reasonably long period and therefore provide a good indication of representative background and residual sound levels.
- Baseline sound level measurements undertaken in accordance with recognised Standards, using a tall environmental windshield and during acceptable weather conditions e.g. low wind speeds and precipitation.
- Field calibration checks were undertaken before and after measurements to record very low levels of equipment drift.
- The calculations have been conservative as not to under-predict the resulting impacts.

These measures have been considered to reduce uncertainty to a level considered not to have any significance to the outcome of this assessment.

4.5. Context

The numerical assessments in the above tables have highlighted an indication of no adverse impact at NSR2 against the representative background sound level during the daytime period. However, an exceedance has been predicted at NSR1 during the daytime period.

It has been acknowledged that this assessment needs to be considered in context, following the requirements of BS4142 [3]. The concept of “context” has been notably emphasised in Section 11 of BS4142 when considering numerical impacts established from applying the standard.

The proposals allow for all operational activities to take place exclusively during the limited daytime period, thereby eliminating any potential noise impact during the more sensitive night-time hours when background sound levels are lower and the likelihood of disturbance is greater.

The noise environment at the nearest noise-sensitive dwellings, located to the north off Hansen Gardens, is predominantly influenced by existing activity from surrounding commercial and industrial units. The most significant source of noise at both measurement positions was the DPD unit situated to the east of the site. Noise from this location consisted of frequent vehicle movements throughout the daytime period, along with operational noise from forklifts and other equipment associated with parcel handling and transit.

5. CONCLUSION

Dice Environmental were commissioned by Ocean Infinity to undertake a Noise Impact Assessment to support a planning application for the proposal at Hamilton Business Park, Southampton.

Environmental noise surveys have been completed to quantify the prevailing soundscape at the site. This comprised 2no, unattended logging survey to capture the existing background noise levels at the nearest noise sensitive receptors (NSRs), supplemented with an attended measurement of the proposed noise sources including the transport and storage of large plant items.

A 3D CadnaA noise model has been constructed to predict the noise impact from the proposed use upon the nearest noise sensitive residents surrounding the site.

An assessment has been undertaken of the noise associated with the proposed use of the external area to the north of the site. The findings indicate that the predicted noise levels from the proposed activity will be below the existing background sound levels at NSR2 whilst a slight exceedance can be found at NSR1. This largely demonstrates compliance with the relevant criteria of BS4142 and indicates that the proposed use is not expected to give rise to any adverse impact at the NSR2. Whilst an exceedance is predicted at NSR1, the context of the operations should be seriously considered as the activities will be sporadic in nature, occurring fleetingly throughout the year, as opposed to per day.

Appendix I – Limitations

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Dice Environmental and the Client as indicated in Section 1.2.
2. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
3. Dice Environmental cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Dice Environmental is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by Dice Environmental in this connection without their explicit written agreement there to by Dice Environmental.
4. Where a noise survey is required to inform the assessment, Dice Environmental will endeavour to ensure that all noise measurements taken are robust, representative and reliable in order to inform an accurate noise impact assessment. Where limitations or constraints exist which prevent a suitable noise survey being completed, Dice Environmental will take all reasonable steps to make the client fully aware of any such limitations or constraints with a view to achieving the best possible outcome for the client. Where additional sound surveys are required, over and above those specified in our scope of works, then Dice Environmental reserves the right to charge additional fees.
5. Where mitigation measures are specified in our report, it should be noted that these measures are relative to a specific sound source, both in terms of the measured sound pressure level and the character of the source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, Dice Environmental cannot be held responsible for any subsequent variations in the proposed mitigation performance.

Appendix II – Glossary of Acoustic Terminology

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character, and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsivity may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the Table A1.

Table A1: Typical Sound Pressure Levels

Sound Pressure Level dB(A)	Location/Example
0	Threshold of hearing
20-30	Quiet bedroom at night
30-40	Living room during the day
40-50	Typical office
50-60	Inside a car
60-70	Typical high street
70-90	Inside factory
100-110	Burglar alarm at 1m away
110-130	Jet aircraft on take off
140	Threshold of pain

Table A2: Terminology

Descriptor	Explanation
Ambient Noise	Encompassing sound, at a given place, being usually a composite of sounds from many sources near and far.
C_{tr}	Sound insulation performance spectrum adaptation term that accounts for the A-weighted urban traffic noise spectrum.
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (20 μ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with the 'A' frequency weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$D_{n,e,w}$	Weighted element normalized level difference. A single-number quantity that describes the sound insulation of ventilators.
$L_{Aeq, T}$	A-weighted, equivalent continuous sound pressure level. L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' time-weighting response.
$L_{A,r,Tr}$	Sound rating level. The A-weighted L_{eq} sound level of an industrial noise during a specified time period, adjusted for tonal character and impulsivity.
L_{10} & L_{90}	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-Field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, this is measured outside and away from buildings.
Fast	A time-weighting used in the root mean square section of a sound level meter with a 125-millisecond time constant.
Pink Noise Spectrum	Noise whose power spectral density is inversely proportional to frequency.
Residual Noise	The ambient sound remaining when the specific sound is suppressed.
R_w	Weighted Sound Reduction Index. A single number quantity which characterises the airborne sound insulation of a material or building element over a range of frequencies, based on laboratory measurements.
Slow	A time-weighting used in the root mean square section of a sound level meter with a 1000-millisecond time constant.
Specific Noise	Noise from the sound source under investigation as defined in BS4142, method for rating industrial noise affecting mixed residential and industrial areas.

Appendix III – Figures



Figure 2: Site Location and Noise Measurement Positions



Figure 3: Example Equipment

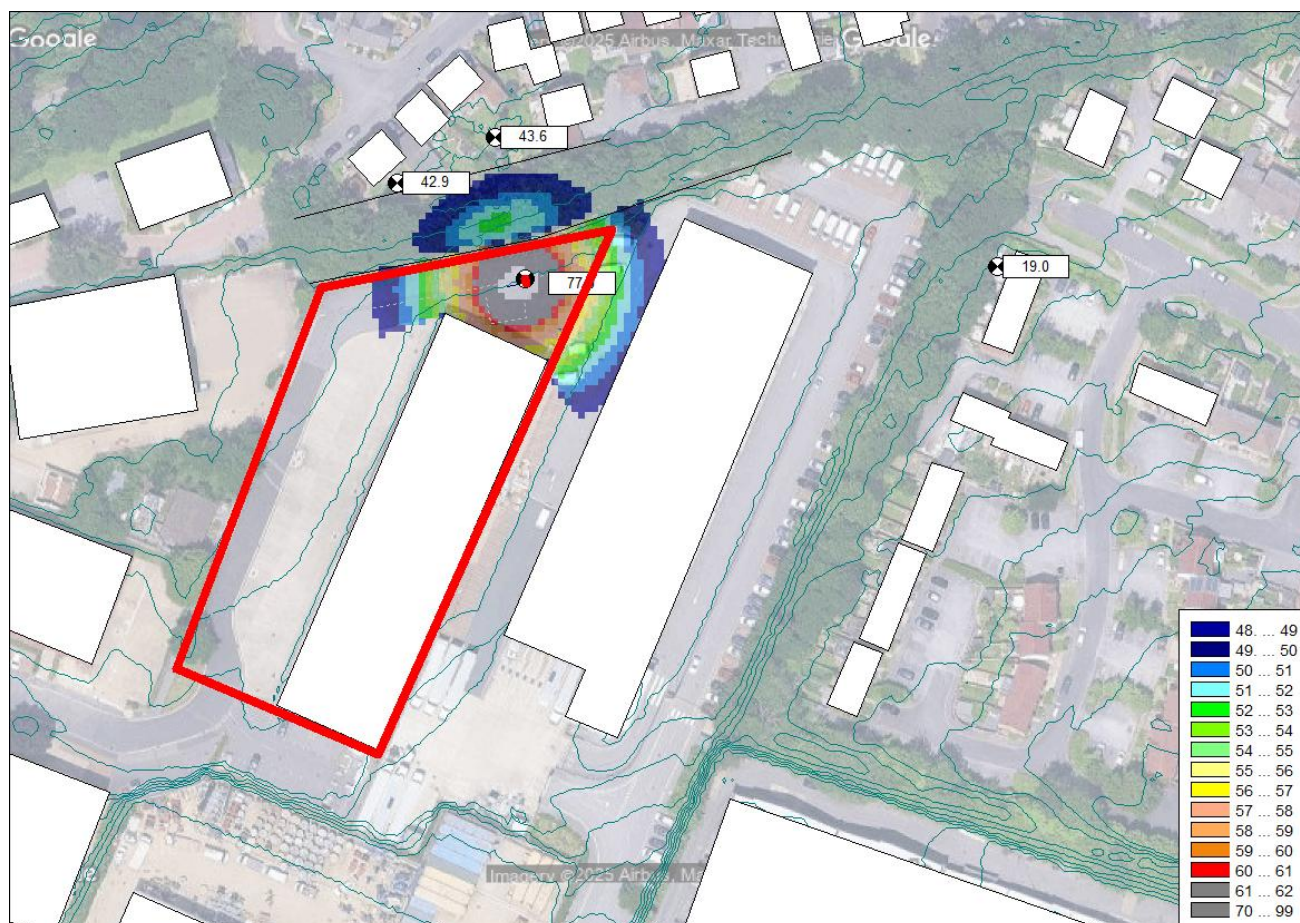


Figure 4: BS4142 Assessment

Appendix IV – Bibliography

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